# Intelligence Collection Guide for Nonferrous Metals and Minerals in Poland

## I. Introduction

Of the nonferrous metals produced in Poland, zinc is the most important in terms of both the value and the tonnage of output. The production of zinc has been large enough not only to satisfy domestic needs, but also to permit substantial exports. Poland also produces lead along with zinc, but production has not been adequate to supply all of the domestic needs. Recently, production of two other nonferrous metals, copper and aluminum, has begun. Whereas output of copper is still short of domestic needs, output of aluminum may be sufficient for current requirements.

Of the various non-metallic minerals produced in Poland, sulfur is currently, and also potentially, the most important. Like the other European Satellites, Poland mines pyrites for sulfur content. The discovery in 1953 of deposits of elemental sulfur indicate however, that Poland may become the first producer in Eastern Europe of elemental sulfur from such deposits.

## II. Zinc and Lead

In general, zinc and lead occur together in various kinds of ore and are produced as co-products. Both metals are widely used in industrial applications. Although Poland's production plans and output of zinc metal have been announced by the government, correasponding data are not available on lead.

### A. Zinc

#### 1. Background

Primary zinc is recovered from its ores either by a process of distillation in one of several types of furnaces (retorts) or by electrolysis. The product -- slabs, blocks, or pigs -- is made in a considerable range of grades according to the purity of the metal.

Because of its great resistance to atmospheric corrosion, the main use of zinc is in coatings to improve the service life of steel products. Zinc is also widely used in alloyed form -- zinc alloys can be melted and used at relatively low temperatures, have little shrinkage, are dimensionally stable, and solidify to a smooth finish. The automobile industry uses a large number of zinc castings, including such items as radiator grills, carburetors, fuel pump bodies, and parts for hydraulic brakes. Another important use of zinc is in brass, which in turn has a variety of uses ranging from cartridge cases to costume jewelry. The applications of rolled zinc are the familiar ones of photoengraving plates, dry cell batteries, and roofing materials.

Poland produces zinc metal from both domestic and imported ores. Zinc ores and concentrates are shipped in from the USSR, Bulgaria, Italy, North

Korea, and Communist China. Quantities of metal produced in excess of its own requirements are exported to both Bloc and Western nations.

A new zinc refinery, the Boleslav plant near Olkusz (50°17'N; 19°34'E), began operating in 1955. It is reported to have doubled Poland's capacity for zinc refining. The plant is also reported to receive its supply of raw material entirely from domestic sources.

2. Requirements

a. What is the present annual capacity and zinc output of the Boleslav plant? What part is represented by electrolytic facilities? How much of Poland's total refining capacity for zinc is represented by this plant? Are there any plans for expansion?

b. Is zinc ore concentrated at the Boleslav plant? If not, where do the concentrates received by the refinery originate? What is the metal content of the concentrates received or produced?

c. What efforts are being made to expand Poland's output of zinc ore and concentrates, thereby reducing imports from foreign sources? What percentage of the annual output of refined zinc comes from domestic ores?

d. What is the cost of the locally produced ores and concentrates to the refineries? What disposition is made of the output of zinc metal? Where are the plants that receive the largest shipments of zinc, and what are the products of such plants? How much do these plants pay for zinc metal? What percentage of the total output of zinc metal is exported, and what countries receive the largest quantities?

B. Lead

1. Background

Lead metal generally is recovered from concentrated ore by smelting in blast furnaces. Usually the bullion so produced must be refined to remove impurities and to recover other metals.

The softest of the base metals, lead can be easily alloyed and cheaply fabricated into cast, rolled, and extruded products for many applications in transportation, communications, and construction. Some of the more improtant uses of lead are in storage batteries, cable coverings, high-octane gasoline, plumbing, ammunition, solder, typemetal, bearings, pigments, and shielding against radioactive radiation.

Although lead is produced in Poland as a co-product with zinc, little specific information is available. The output of lead metal in 1956 is estimated at no more than 30,000 tons, but this probably was not adequate for domestic needs because some metal was imported in the form of ingot from foreign sources.

2. Requirements

a. What is the current annual output of lead metal in Poland? What is the production of each plant? How much of the output is derived from domestic ores and concentrates and how much from imported materials?

b. What countries ship lead ore and concentrates to Poland? How much lead metal is imported, and where does it originate? How does Poland pay for its lead imports?

c. What is the average ratio of lead to zinc in the locally mined ores? In the locally produced concentrates? What is the cost of the locally produced ores and concentrates to the refineries?

d. What is the total annual consumption of lead metal in Poland? What plants receive the largest shipments of lead, and what do such plants manufacture? How much do these plants pay for lead metal?

III. Aluminum

A. Background

Aluminum metal is reduced electrolytically from aluminum oxide (alumina), which usually is manufactured from the ore, bauxite. Four to five tons of European bauxite are required to produce the two tons of alumina necessary for the production of each ton of metal.

Because of its light weight, strength, and relatively low cost, aluminum has no equal as an alloy base in the manufacture of many parts used in aircraft. These and other desirable characteristics also make it possible for aluminum to be used in place of other, more costly metals. As a substitute for relatively scarce copper in the electrical machinery industry, for example, aluminum has become particularly important throughout the Bloc.

Poland's only plant for the production of primary aluminum was completed in 1954 at Skawina (49°00'N; 19°50'E) and came into full operation in 1955. Its output in that year was 20,400 metric tons. It is believed that the alumina supplies for the Skawina plant are imported, mainly from Hungary.

After considering the necessary investment, Poland has cancelled its plans for expanding aluminum capacity. It appears that the lack of adequate domestic supplies of bauxite or other aluminous raw materials and of electric power were instrumental in the decision not to expand Poland's aluminum industry at this time.

B. Requirements

1. What are Poland's total annual requirements for aluminum? What plants receive the largest aluminum shipments and what do they manufacture? Are Poland's requirements expected to increase appreciably during the current Five Year Plan (1956-60)? If so, what sectors of the economy will account for the increase?

2. What is the reason for Poland exporting primary aluminum during 1956-57?

3. Are facilities for processing aluminum into rolled, drawn, extruded, and cast products being developed? If so, locate and describe such fabricating plants, and note any plans for additional facilities.

4. What evidence exists of current planning for the domestic production of alumina to supply the Skawina reduction plant?

5. How much do the fabricating plants pay for aluminum from the Skawina plant? What is the price paid by Poland for the imported alumina?

IV. Copper

A. Background

Measured either by tonnage or value of output, copper is the most important nonferrous metal in the world. The electric and thermal conductivity is next to that of silver; and it is strong, malleable, ductile, and corrosion resistant. In its more important application, the electrical industry, it is used for the most part in its purest metallic form. Alloyed, primarily as brass and bronze, it is used throughout all industry in cast and wrought products. Apart from general military and structural applications, it is a key item in the development of all industrialized nations, because of its importance to electrification and communications programs.

Most copper ores are made into concentrates which can be smelted in reverberatory furances to produce matte. This matte is then charged to a converter, which resembles very closely the Bessemer converter so well known in the steel industry. The product of the converter is generally called blister copper. As a final step of purification, blister copper usually is refined by electrolysis. The electrolytic copper is cast in shapes suitable for alloying or fabrication. These shapes include ingots, billets, and wirebars.

Throughout the Bloc copper continues to be in short supply. In Poland copper production was of minor significance until 1955 when an electrolytic refinery at Legnica (Liegnitz, 51°12'N; 16°12'E) began operating. A smelter is reported to have been erected recently at the zinc works at Trzebinia (50°10'N; 19°29'E). This plant apparently furnishes the Legnica plant with blister copper. Some electrolytic refining capacity for copper exists in the lead-zinc refinery at Szopienice (50°16'N; 19°07'E).

B. Requirements

1. What is the country's total production and/or capacity for refined copper? What is Poland's total annual production and/or capacity for electrolytic copper? What portion of this capacity is represented by the Legnica plant? Is copper still being refined at the Szopienica lead-zinc refinery?

2. Does Poland supply this refining capacity from domestically produced ores, concentrates, and blister? If not, from where and in what forms is material received?

3. Are facilities for processing copper into semifinished products being developed? If so, what is known of their output (cast, rolled, drawn, and extruded products)? Are they to be supplied with domestically refined copper, or are some requirements to be met from imported metal?

4. What are Poland's total annual requirements for refined copper? What portion is supplied by domestic industry? Can a use pattern be provided for major consuming sectors of the economy?

5. Is there a copper concentrator at Legnica? If so, describe.

6. How much copper is imported by Poland? Does all of the copper imported remain in Poland, or is part re-exported to other Bloc countries? If so, to what countries and in what quantities?

7. How much does Poland pay for imported copper? How much do the consuming plants pay for copper?

V. Sulfur

A. Background

As in all other nations, sulfur is important to the industrial development of Poland because its principal derivative, sulfuric acid, is essential to basic industry. The process of converting natural sulfur to acid is simple and cheap compared with that involved in extracting sulfur from pyrites and gypsum. The United States is unique among the large industrial nations of the world in being abundantly endowed with large, exploitable deposits of elemental sulfur.

Poland, as does the rest of the countries in the Bloc, relies on pyrites as its major source of sulfur. The recent discoveries of native sulfur deposits in the vicinity of Tarnobrzeg (50°35'N; 21°41'E) may, however, be of considerable importance to Poland if the deposits are as large and as rich as reported. As far as is known, commercial production is not scheduled to begin before 1958. The USSR and Czechoslovakia have also expressed interest in the exploitation of these deposits.

B. Requirements

1. What progress and/or plans have been made for exploiting the Tarnobrzeg deposits?

2. What is the planned production of sulfur for 1958? When will full production begin, and what will be the annual output when capacity operation is attained?

3. What is to be the annual capacity of the sulfur refining facilities?

4. Where are the sulfuric acid plants located and what is the capacity of each.